

## Number 1

- News from the BIPM 1  
T.J. Quinn
- The Effect of Variations in the Refractive Index of Industrial Air upon the Uncertainty of Precision Length Measurement 7  
K.P. Birch, F. Reinboth, R.E. Ward and G. Wilkening
- Some Recommendations for the Designers of the Next Generation of Superconducting Magnetic Levitation Systems 15  
E.T. Frantsuz and V.M. Khavinson
- Intercomparing the Freezing Behaviour of Silver Cells of the NRC and the ITRI 23  
J. Ancsin
- International Comparison of Impedance in Coaxial Line at 100, 200 and 300 MHz 31  
J.P. Ide, H. Bayer, R.N. Jones, J.P.M. de Vreede and P.I. Somlo
- Effect of Line Pressure on the Zero Stability of a Differential Quartz Bourdon Gauge for Various Gases 37  
J.K.N. Sharma, D.R. Sharma and A.C. Gupta
- Short Communication*
- The Maintenance of a Scale of Illuminance with Quartz Halogen Tungsten Filament Lamps 45  
W.J. Brown
- Letter to the Editor*
- On the Definition of Freezing Points in the ITS-90 49  
Yu. I. Alexandrov, A.G. Ivanova and A.I. Pokhodun

## Number 2

- Physiological Units in the SI 55  
R.A. Nelson and L. Ruby
- Hyperfine Structure Analysis of the  $33\text{P}(6-3)$  Line of  $^{127}\text{I}_2$  at 633 nm Using a Continuous-wave Tunable Dye Laser 61  
A. Razet, J. Gagniere and P. Juncar
- Effect of Free Convection on the Apparent Mass of 1 kg Mass Standards 67  
M. Gläser and J.Y. Do
- A Measurement of the Nuclear Magnetic Moment of the Helium-3 Atom in Terms of that of the Proton 75  
J.L. Flowers, B.W. Petley and M.G. Richards

- Comparison of GLONASS and GPS Time Transfers 89  
P. Daly, N.P. Koshelyaevsky, W. Lewandowski, G. Petit and C. Thomas
- Gauge-block Interferometer Based on One Stabilized Laser and a White-light Source 95  
E. Ikonen and K. Riski
- Short Communications*
- A Gallium Calibration Apparatus 105  
J. Ancsin
- Expression of the Difference Between Representations of a Unit in Terms of Transfer Standard Data 107  
V.S. Tuninsky
- Comparison of Josephson Voltage Standards of the National Research Council of Canada and the Bureau International des Poids et Mesures 109  
D. Reymann, B. Wood and T.J. Witt

## Number 3

- A Superconductor Analogue of the Thompson-Lampard Theorem of Electrostatics and its Possible Application to a New SI Standard of DC Resistance 117  
R.B. Frenkel
- Surface Analytical Study of Cleaning Effects and the Progress of Contamination on Prototypes of the Kilogram 133  
S. Ikeda, K. Uchikawa, Y. Hashiguchi, M. Nagoshi, H. Kasamura, K. Shiozawa, D. Fujita and K. Yoshihara
- Uncertainty in Frequency Measurements at 88 THz Made with the NRC Frequency Chain: Frequency of the NRC HeNe/ $\text{CH}_4$  Laser 145  
B.G. Whitford
- An Updated Edlén Equation for the Refractive Index of Air 155  
K.P. Birch and M.J. Downs
- The Magnesium Frequency Standard 163  
A. Godone and C. Novero
- Comparison of GPS Common-view and Two-way Satellite Time Transfer over a Baseline of 800 km 183  
D. Kirchner, H. Ressler, P. Grudler, F. Baumont, Ch. Veillet, W. Lewandowski, W. Hanson, W. Klepczynski and P. Uhrich

## Short Communication

- On the Hyperfine Spectrum of the 62P(17-1)  
Line of  $^{127}\text{I}_2$  at 576 nm 193  
A. Razet

## Letters to the Editor

- Wavelength Dependence of Normal Spectral Emissivity  
at the Melting Point of Refractory Transition Metals 197  
F. Righini, A. Rosso, A. Cezairliyan and A.P. Müller
- Reply from C. Ronchi, J.P. Hiernaut  
and G.J. Hyland 199

## Number 4

- Foreword 205  
B.W. Guenther
- An Anecdotal Review of NASA Earth  
Observing Satellite Remote Sensors and  
Radiometric Calibration Methods 207  
J. Nithianandam, B.W. Guenther and L.J. Allison
- Calibration Plans for the Multi-angle  
Imaging SpectroRadiometer (MISR) 213  
C.J. Bruegge, V.G. Duval, N.L. Chrien and D.J. Diner
- Clouds and the Earth's Radiant Energy System  
(CERES): Long-wave Calibration Plan and  
Radiometric Test Model (RTM) Calibration Results 223  
P.J. Jarecke, M.A. Folkman, T.R. Hedman and M.E. Frink
- Radiometric Calibration of the EOS ASTER  
Instrument 231  
F. Sakuma and A. Ono
- Calibration and Radiometric Stability of the Shuttle  
Solar Backscatter Ultraviolet (SSBUV) Experiment 243  
E. Hilsenrath, D.E. Williams, R.T. Caffrey, R.P. Cebula  
and S.J. Hynes
- An Iodine Standard Lamp 249  
S.J. Davis, K.W. Holtzclaw, K.R. McManus and L.G. Piper
- Performance of Various Diffuser Materials in the  
Absolute Radiometric Calibration of the SBUV/2 255  
W.K. Fowler and V.W. Nelson
- Comparison of Spectral Radiance Calibrations  
of SBUV-2 Satellite Ozone Monitoring Instruments  
Using Integrating Sphere and Flat Plate Diffuser  
Techniques 259  
D.F. Heath, Zhongying Wei, W.K. Fowler and V.W. Nelson
- An Ambient Background Transfer Standard  
Radiometer 265  
J.W. Hoffman and R. Heppner

- A Comparative Study of Solar Total Irradiance  
Measured by Active-cavity Radiometers 271  
A. Mecherikunnel
- SOURCE: The Solar Ultraviolet Radiation  
and Correlative Emissions Mission 275  
P.L. Smith, J.L. Lean, A.B. Christensen, K.L. Harvey,  
D.L. Judge, R.L. Moore, M.R. Torr and T.N. Woods
- Application of Cryogenic Electrical Substitution  
Radiometers in the Calibration of Solar-  
Terrestrial Remote Sensing Instruments 279  
P.V. Foukal and J. Jauniskis
- Comparison of the NIST High Accuracy  
Cryogenic Radiometer and the NIST Scale  
of Detector Spectral Response 285  
J.M. Houston, C.L. Cromer, J.E. Hardis and T.C. Larason
- Present State of the PTB Primary Standard for  
Radiant Power Based on Cryogenic Radiometry 291  
K.D. Stock and H. Hofer
- Characterization of Photodiodes in the UV  
and Visible Spectral Region Based on  
Cryogenic Radiometry 297  
Fu Lei and J. Fischer
- Cryogenic Solar Absolute Radiometer (CSAR) 305  
J.E. Martin and N.P. Fox
- A Method of Realizing Spectral Irradiance  
Based on an Absolute Cryogenic Radiometer 309  
B. Carol Johnson, C.L. Cromer, R.D. Saunders,  
G. Eppeldauer, J. Fowler, V.I. Sapritsky and G. Dezzi
- Characterization of a High Sensitivity  
Composite Silicon Bolometer 317  
G. Eppeldauer, A. Migdall and C. Cromer
- Improved Near-Infrared Detectors 321  
N.P. Fox
- Alternative Configurations for Trap Detectors 327  
J.M. Palmer
- The Application of an Optical Biasing Method  
to Determine Temperature-dependent Nonlinearity  
of Photovoltaic Ge Detectors 335  
J.P. Makai and C.L. Cromer
- Intercomparison between the NIST LBIR  
Absolute Cryogenic Radiometer and an  
Optical Trap Detector 341  
S.R. Lorentz and R.U. Datla
- A Physical Basis for the Extrapolation of  
Silicon Photodiode Quantum Efficiency  
into the Ultraviolet 345  
N.M. Durant and N.P. Fox
- Fatigue Effects in Germanium Photodetectors 351  
P. Lecollinet and J. Bastie

Automated Absolute and Relative Spectral Linearity Measurements on Photovoltaic Detectors	355	Standard of Specular Reflectance at Glancing Incidence for the Infrared Region	433
L.P. Boivin		D. Gupta and S.P. Varma	
Uniformity of Quantum Efficiency of Single and Trap-configured Silicon Photodiodes	361	Present State of the Comparison Between Radiometric Scales Based on Three Primary Standards	439
M.G. White and A. Bittar		M. Stock, J. Fischer, R. Friedrich, H.J. Jung, R. Thormagel, G. Ulm and B. Wende	
Characterization of Two Bolometric Absolute Radiometers	365		
J.F. Clare			
Absolute Measurement of Quantum Efficiency Based on Parametric Down-conversion Effect	367		
V.M. Ginzburg, N.G. Keratishvili, Ye.L. Korzhenevich, G.V. Lunev and A.N. Penin			
Low Temperature Black Body for Temperatures from 80 K to 300 K	369		
S.P. Morozova, B.E. Lisiansky, P.A. Morozov and V.I. Sapritsky			
Getting Intense on Intensity	371		
J.M. Palmer			
Recommendations for Future Work in Air UV Spectral Radiometry: Results of a Report to the CCPR	373		
E. Tegeler			
Preliminary Results from the SOVA Experiment on Board the European Retrievable Carrier (EURECA)	375		
D. Crommelynck, V. Domingo, A. Fichot, C. Fröhlich, B. Penelle, J. Romero and Ch. Wehrli			
Hollow Cathode Transfer Standards for the Radiometric Calibration of VUV Telescopes of the Solar and Heliospheric Observatory (SOHO)	381		
J. Hollandt, M.C.E. Huber and M. Kühne			
In-flight Evaluations of Tungsten Calibration Lamps Using Shortwave Thermistor Bolometers and Active-cavity Radiometers	389		
R.B. Lee III, L.M. Avis, M.A. Gibson, S. Thomas and R. Wilson			
Using the <i>Voyager</i> Spacecraft for Solar EUV Spectral Radiometry	397		
P.L. Smith, B.R. Sandel and J.B. Holberg			
Network and Traceability of the Radiometric and Photometric Standards at the PTB	403		
J. Metzdorf			
Atmospheric Optical Calibration System for Outdoor Testing of Photovoltaic Devices	409		
T.W. Cannon and R.L. Hulstrom			
Partial Coherence and Practical Radiometry	419		
J.L. Gardner			
Improved Spectral Responsivity Scales at the NPL, 400 nm to 20 m	425		
D.H. Nettleton, T.R. Prior and T.H. Ward			
		<b>Number 5</b>	
		Three-component Laser Doppler Anemometer for Gas Flowrate Measurements up to 5 500 m <sup>3</sup> /h	453
		D. Dopheide, V. Strunck and E.-A. Krey	
		The Noise Temperature of an Arbitrarily Shaped Microwave Cavity with Application to a Set of Millimetre Wave Primary Standards	471
		W.C. Daywitt	
		Estimating the Instabilities of <i>N</i> Clocks by Measuring Differences of their Readings	479
		P. Tavella and A. Premoli	
		A General Approach to Comparisons in the Presence of Drift	487
		C.M. Sutton and M.T. Clarkson	
		Uncertainty Modelling in Mass Comparisons	495
		W. Bich, M.G. Cox and P.M. Harris	
		<b>Short Communications</b>	
		Comparison of He-Ne Lasers from the LMM and the IMGC Stabilized on <sup>127</sup> I <sub>2</sub> at 633 nm	503
		J. de Vicente, A.M. Sánchez-Pérez and F. Bertinotto	
		Contamination of Platinum Resistance Thermometers by Silver	507
		J. Ancsin and K.D. Hill	
		Observation and Precise Measurement of Subharmonic Voltage Steps on a 1 V Josephson Junction Array	511
		G. Genevès, J.-P. Lo-Hive, D. Reymann and T.J. Witt	
		<b>Letter to the Editor</b>	
		Roughness of Smooth Surfaces: STM versus Profilometers	513
		L.L. Madsen, J.F. Jørgensen, K. Carneiro and H.S. Nielsen	
		<b>International Reports</b>	
		New International Standards for Quantities and Units	517
		A.J. Thor	
		<i>Mise en Pratique</i> of the Definition of the Metre (1992)	523
		T.J. Quinn	

## Number 6

Foreword G.F. Molinar	543	Stability of Piston-Cylinder Assemblies from an Experience of Fifteen Years J.C. Legras	625
Three and a Half Centuries Later - The Modern Art of Liquid-column Manometry C.R. Tilford	545	Analysis of Piston-Cylinder Systems and the Calculation of Effective Areas M.P. Fitzgerald and A.H. McIlraith	631
Use of a Precision Mercury Manometer with Capacitance Sensing of the Menisci J. Jäger	553	Elastic Distortion Calculations on a Special Piston Gauge (PG27) up to 28 MPa in Different Operational Modes G.F. Molinar, P.C. Cresto, C. Ehrlich and J. Houck	635
Error Budget and Accuracy of the IMGC Manobarometer Model BIPM/JAEGER with Automatic Data Acquisition P.P.M. Steur and F. Pavese	559	Computer-aided Modelling of Pressure Balances N.D. Samaan and F. Abdullah	641
New Mercury Interferometric Baromanometer as the Primary Pressure Standard of Japan A. Ooiwa, M. Ueki and R. Kaneda	565	Experiments on the Effect of Torque Used in Mounting the Cylinder on the Effective Area of a Pressure Balance M. Rantanen	645
A New Generation of Mercury Manometers at the IMGC F. Alasia, A. Capelli, G. Cignolo and M. Sardi	571	A New Method for the Functional Characterization of Piston-Cylinder Assemblies D. Marqués, J. Forastieri, C. Comi, N. Pomme and D. Jungman	649
A Heterodyne Laser Interferometric Oil Manometer M. Ueki and A. Ooiwa	579	Computerized Techniques for Calibrating Pressure Balances D.I. Simpson	655
A Review of Gas-operated Piston Gauges C. Ehrlich	585	Digital Piston Manometers: Are they Primary or Transfer Standards? L. Dargent	659
The Pressure Balance as an Absolute Pressure Standard C.M. Sutton	591	Density, Thermal Expansion and Compressibility of Mercury K.-D. Sommer and J. Poziemski	665
Measurements of the Gas Dependence of the Effective Area of a Piston Gauge Using H <sub>2</sub> , <sup>3</sup> He, <sup>4</sup> He, N <sub>2</sub> , CO <sub>2</sub> and SF <sub>6</sub> C.W. Meyer and M.L. Reilly	595	Candidate Fluids for High-pressure Piston Standards: State of the Art and Possible Trends Ph. Vergne	669
Gas and Mode, Vertical and Rotational Effects with a Three Piston Gauge Apparatus J.W. Schmidt, B.E. Welch and C.D. Ehrlich	599	Phase Transitions in Pure Castor Oil at Pressures Below 1 GPa R. Wiśniewski, R.M. Siegoczyński and J. Jędrzejewski	673
Bilateral Comparative Pressure Measurements of the LNE and the PTB Using 10 cm <sup>2</sup> Piston-Cylinder Assemblies G. Klingenberg and J.C. Legras	603	New High-precision Reference Pressure Transducers from 1 MPa to 50 MPa H. Paul	677
Novel Nonrotational Piston Gauge with Weight Balance Mechanism for the Measurement of Small Differential Pressures A. Ooiwa	607	A Pressure Transducer with a Ceramic Free-rod as the Active Element R. Wiśniewski and G.F. Molinar	683
A Large Area Piston Gauge for Differential and Gauge Pressure from Zero to 3,2 kPa C.G. Rendle	611	A New Design of Manganin Gauge and its Metrological Characteristics S.Y. Woo, A. Keprt and H.J. Lee	687
An Old Instrument in the New Technological Scenery: The Piston Gauge in Liquid Media up to 1 GPa G.F. Molinar	615	A Free-rod Strain-gauge Pressure Transducer of 1 GPa Capacity G.F. Molinar, R. Wiśniewski and L. Bianchi	691

New Ideas in Semiconductor Pressure Sensors W. Trzeciakowski	695	EUROMET Intercomparison in the Pressure Range 100 MPa to 700 (1000) MPa J.C. Legras, J. Jäger, G.F. Molinar, S. Palomino, J. Quintas and M.R. White	721
Pressure Intercomparisons at the Lowest Level of Uncertainty: Transfer Standards and Results J.C. Legras	701	Measurement Uncertainties of U-tube Manometers and Pressure Balances P.R. Stuart	727
Progress Report on an International Inter- comparison in the Pressure Range 10 kPa to 140 kPa P.R. Stuart	705	Dynamic Pressure Metrology V.E. Bean	737
Intercomparison of Primary Manometers in the Range 30 kPa to 110 kPa: Pressure Balance at the LNE and Mercury Manometer at the VNIIFTRI D.N. Astrov, J. Guillemot, J.C. Legras and A.A. Zakharov	711	Means of Dynamic Calibration for Pressure Transducers J.P. Damion	743
Experience in the Use of a Strain-gauge Pressure Transducer for Comparison in Liquid Media up to 600 MPa between the NIST and the IMGC G.F. Molinar, R. Maghenzani, V.E. Bean and D. Ward	717	Development of a Primary Standard for the Measurement of Dynamic Pressure and Temperature V.E. Bean, W.J. Bowers Jr., W.S. Hurst and G.J. Rosasco	747
		The SMU Primary Mercury Manometer and its Comparison with Three Manometers of Different Design P. Farár, T. Skrovánek, Z. Faltus and M. Chytil	751